

Appl. No. 10/698,395

REMARKS/ARGUMENTS

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Status of Claims

Claims 1 to 27 are currently pending in the application.

Amendments to the Claims

In claim 1, the clause reciting "for each antenna" has been amended to include the limitation "using a spreading code common to all signal generators".

The "wherin" clause at the end of claim 1 has been replaced with "for each pair of said antennas having overlapping beams within said coverage area, the respective signal generators using the spreading code with a mutual micro-timing offset that is large enough that destructive cancellation substantially does not occur between the common overhead components transmitted on the pair of antennas". This amended portion is substantially what was recited formerly in the last clause of the claim, but now includes reference to the spreading code introduced earlier in the amended claim.

Claim 1 has been further amended to recite that the signals are "transmitted substantially simultaneously".

Claim 10 has been amended by changing the dependency from claim 4 to claim 6.

Claim 17 has been amended by changing the dependency from claim 4 to claim 16.

Claim 23 has been amended by replacing the expression "the frame rate" with "a frame rate".

Claim 26 has been amended by replacing "between signals" with "of a spreading code used by the signals".

Claim Objections

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With respect to claim 23, the Examiner has objected to the limitation "the frame rate" as having insufficient antecedent basis. Based on the amendment to claim 23, this objection is rendered moot.

35 U.S.C 103 Rejections

The requirements for establishing a *prima facie* case of obviousness as set out in the MPEP Section 2143.01 require that references when combined teach all of the claimed limitations, that there be a reasonable expectation of success in realizing the claimed invention, and that there be a motivation to combine the references.

The Examiner has stated that claims 1 to 5, 15 to 17 and 26 are unpatentable under 35 U.S.C. 103(a) over Tong (United States Patent Publication No. 2001/0034236) in view of Wong (United States Patent No. 6,330,460).

The Examiner alleges that Tong discloses all the limitations recited in claim 1 except "for each antenna a respective signal generator generating a respective signal comprising a common overhead component common to all the signals". This limitation is alleged to be disclosed by Wong.

With respect to Tong, the Examiner in particular equates "each pair of signals transmitted on an adjacent pair of said antennas has a respective mutual micro-timing offset which is large enough that destructive cancellation substantially does not occur between the pair" with the disclosure in Tong at paragraphs [0037] and [0056].

At paragraph [0015] Tong discloses:

"The entire multi-beam configuration for a base station is arranged such that no adjacent beams, even across sector boundaries, are transmitting data on the forward link during the same time intervals. Thus, to achieve interference avoidance, the present invention involves synchronizing the packet transmission timing interval and scheduling packet transmission times such that adjacent beams do not transmit data during the same intervals" (emphasis added).

At paragraph [0037], with reference to Figure 3, Tong discloses:

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"In a design having four user-group area areas in a sector, as shown in FIG. 3, the 'even' time slots carry transmissions for user-group area areas 1 and 3, whereas the subsequent 'odd' time slots carry data transmissions for user-group areas 2 and 4."

Tong is essentially disclosing a time division multiplexing (TDM) scheme for transmitting to select areas in a given sector, for example user-group 1, user-group 2, user-group 3 and user-group 4 in sector 1 of Figure 2A. Tong discloses that as transmitting only occurs in one area of a pair of adjacent areas for a particular time slot, interference between adjacent areas is mitigated.

Amended claim 1 recites the "respective signal generators using the spreading code with a mutual micro-timing offset". As described starting on page 10, line 24 of the present application:

"However, in this embodiment of the invention, a small time offset is applied to the PN code used in two of the three CDMA signal generators, the effect of this being that the first signal 226 is generated with a PN code PN(t), the second signal 230 is generated using the PN code PN(t+ Δt_1) and the third signal 234 is generated with a PN code PN(t+ Δt_2). In other words, the PN code used to generate the second signal 230 is offset from that used to generate the first signal 226 by a time offset Δt_1 . Similarly, the PN code used to generate the third signal 234 is offset from that used to generate the second signal 230 by a time offset of $\Delta t_3 = \Delta t_2 - \Delta t_1$. Each PN-code generator may for example be implemented with a series of flip-flops with specific interconnects. Different time offset can be achieved by starting the flip-flops at a predefined state at t=0. Different time-shifts require different starting defined states. There are many other ways of PN code generation which would be understood by one skilled in the art. The offsets Δt_3 , Δt_1 are selected to reduce substantially interference overhead portions transmitted on overlapping beams in a single sector".

The use of timing offsets for the same spreading code for the respective first, second and third signals in the example described above is not the same as the TDM scheme disclosed by Tong in which signals are temporally multiplexed in a manner that signals transmitted in adjacent areas are not transmitted at the same time. Using spreading codes in the manner recited in the present

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claim allows signals in adjacent areas to be transmitted at the same time or at least overlapping in time, but in a manner that “destructive cancellation substantially does not occur between the pair”.

The Examiner alleges the disclosure in paragraph [0056] of time slots in a superframe being 1.25ms (1250 microseconds) is equivalent to a “micro-timing offset”. Applicant submits that “micro-timing offset” does not specifically refer to a timing offset in microseconds. The difference between TDM used by Tong and the spreading code multiplexing used in the present application is fundamentally different. The size of the slot in Tong (1.25ms) is unrelated to the size of the “micro-timing offset” recited in claim 1.

Wong does not disclose “for each pair of said antennas having overlapping beams within said coverage area, the respective signal generators using the spreading code with a mutual micro-timing offset that is large enough that destructive cancellation substantially does not occur between the common overhead components transmitted on the pair of antennas”.

For at least the reasons discussed above, Applicant respectfully submits that Tong and Wong, either alone or in combination, do not teach all the limitations recited in the independent claims as alleged by the Examiner. Applicant submits that the Examiner has failed to satisfy a first criterion required in establishing a *prima facie* case of obviousness, namely that all limitations be taught by the cited art.

Tong discloses a TDM scheme for achieving interference avoidance that “involves synchronizing the packet transmission timing interval and scheduling packet transmission times such that adjacent beams do not transmit data during the same intervals” (page 2, paragraph [0015]). Wong discloses a wireless communication system that in some embodiments includes dedicated and common pilots within beam formed signals (column 3, lines 45-67). Applicant submits that a combination of the subject matter of the two references would simply result in a TDM scheme according to Tong that has common pilot information transmitted at the times a given beam is allocated to be transmitting. As such a system is not what is recited in the claimed invention, Applicant submits there would be no motivation to combine the references.

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Furthermore, Applicant submits that neither of the two pieces of cited art suggest the subject matter of the other piece of prior art in a manner that would lead one skilled in the art to arrive at the claimed invention by a review of the two references. In addition, neither reference refers to the other. The respective prior art does not suggest, either alone or in combination the desirability of the claimed invention.

As was clearly stated *In re Kotzab*, 55 USPQ2d 1313, 1318 "Identification of prior art statements that, in abstract, appear to suggest claimed limitation does not establish *prima facie* obviousness without a finding as to specific understanding or principle within knowledge of skilled artisan that would have motivated one with no knowledge of invention at issue to make combination in manner claimed" (emphasis added).

The Examiner states it would have been obvious to combine the teachings of Tong and Wong "for the purpose of aiding each mobile in determining it's highest data rate as taught by Wong". Applicant respectfully submits that this alone is not a sufficient motivation to combine the two cited references. The mere disclosure of aiding each mobile in determining it's highest data rate by Wong does not provide sufficient motivation to combine the two references and arrive at the claimed invention, particularly when all the limitations are not disclosed and the Examiner does not disclose the motivation for including the missing limitations.

Applicant submits there is no teaching, suggestion, or motivation to combine the teachings of Tong and Wong in the manner proposed by the Examiner in the Office Action. The Examiner has failed to satisfy the third criterion for establishing a *prima facie* case of obviousness, namely that there be a motivation to combine the references.

As the Examiner has failed to satisfy the necessary criteria for establishing a *prima facie* case of obviousness with respect to claim 1, for at least the reasons discussed above, Applicant submits that claim 1 patentably distinguishes over the cited references of Tong and Wong, either alone or in combination.

The subject matter of amended claim 26 is substantially the same as claim 1, with the additional limitation that the method of claim 26 is directed to a CDMA antenna system.

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For at least the reasons discussed above, it is respectfully submitted that the Examiner has erred in rejecting the independent claims 1 and 26. It is respectfully requested that the Examiner withdraw the obviousness rejection to the identified claims.

In regard to claims 2 to 5 and 15 to 17, which were also rejected on the basis of the combined teachings of admitted prior art, Tong and Wong, each of these claims depends from one of the independent claims and therefore similarly distinguishes over the cited prior art. It is respectfully requested that the Examiner withdraw the obviousness rejection to the identified claims.

All of the remaining claims have been rejected under 35 U.S.C. 103(a) as being unpatentable over Tong in view of Wong and in view of various other references. Claims 6 to 14 and 18 to 25 depend from independent claim 1, either directly or indirectly, and accordingly the arguments presented above in respect of those independent claims are also pertinent to these dependent claims. Claim 27 depends from independent claim 26 and accordingly the arguments presented above in respect of claim 26 are also pertinent to dependent claim 27.

It is submitted that the Examiner has not satisfied the necessary requirements to establish a *prima facie* case of obviousness for these dependent claims for at least the reasons discussed above with regard to the independent claims upon which the claims depend. It is respectfully requested that the Examiner withdraw the obviousness rejection to the identified claims.

In view of the foregoing, early favorable consideration of this application is earnestly solicited.

Respectfully submitted,
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